REMARKS

Claims 13-41 remain in this application.

Claims 13-18, 20, 21, 25-27, and 34-41 were rejected as unpatentable over newly cited McKinney U.S. Patent No. 4016562 ("McKinney") in view of Khan U.S. Patent No. 6059957 ("Khan") and Gomi U.S. Patent No. 3689401 ("Gomi"). The rejection relies on McKinney for a teaching of providing a hydrodesulfurized residual oil and hydrogen-containing gases to a thermal cracking step at 1300-2500 degrees F for a 0.05-2.00 second residence time and immediately quenching. The rejection relies on Khan or Gomi for a stabilizing step. Applicant respectfully traverses the rejection.

McKinney is directed to an entrained hot solids process for cracking naphtha, light gas oil, heavy gas oil, or the like to produce ethylene and hydrogen wherein most of the product is gaseous (ethylene and hydrogen). See McKinney at column1, lines 10-24.

McKinney teaches against the current invention by not providing a hydrogen-containing gas to the cracking step. McKinney feeds hydrogen only to the hydrodesulfurization step but removes it prior to the cracking process. See McKinney at column 1, lines 53-55; column 12, lines 1-7; column 14, lines 41-44; and claim 10 at column 16, lines 49-53. While McKinney produces hydrogen from the hydrocarbon molecules during the production of ethylene, the hydrogen is not involved in cracking heavy oil to a liquid product.

McKinney appears to be directed to light oils susceptible to ethylene production as given in FIG. 2 (Kuwait Naphtha, Kuwait Light Gas Oil, and Kuwait Heavy Gas Oil).

Accordingly, McKinney does not disclose a process passing oil and hydrogen-containing gas to a thermal cracking step and McKinney does not produce 80 wt.% or greater liquid products. Neither Khan nor Gomi teach or suggest a quench and stabilization process for stabilizing a quench oil/light oil product.

Irrespective of the additional combinations of McKinney teachings and art-known process steps as given in Office Action paragraphs 3-8, the combination of references fails to teach the claimed invention as detailed above; in fact, McKinney's teaching is contrary to the invention regarding hydrogen inclusion and does not produce 80 wt.% liquid products. Withdrawal of the rejection is respectfully requested.

Claims 22, 23, 32, and 33 were rejected as above and further in view of Gregoli U.S. Patent No. 6016868 ("Gregoli") because Gregoli provides a teaching of removing gases and a 50% conversion. Of course, the application of Gregoli to McKinney is nonsensical because McKinney produces a gaseous product and recycles entrained hot solids. In any case, the combination of references does not teach a hydrogen and heavy oil cracking followed by quenching and stabilization as described to produce at least 80 wt.% liquid products. Withdrawal of this rejection is also requested.

Claims 19 and 29-31 were rejected as in the first instance above (Office Action paragraph 1) further in view of Benham U.S. Patent No. 6004453 ("Benham") for Benham's teaching of predominantly recycling the product stream. Once again, the skilled artisan is not taught how to apply the liquid phase process of Benham to McKinney and even if Benham provides a method to reduce coking, the combined references do not teach the invention as claimed. Withdrawal of this rejection is also requested.

Claim 28 was rejected as first above and further in view of Fuderer U.S. Patent No. 4822521 ("Fuderer") for Fuderer's teaching of a steam to hydrocarbon ratio to produce syngas. There is no suggestion in Fuderer to apply the methane syngas reformer process to heavy oil cracking especially since Fuderer is directed to merely syngas production, let alone a combination with quench oil. Withdrawal of this rejection is also rejected.

A prima facie case of obviousness has not been met because there is no motivation or suggestion to make the claimed invention in light of the prior art teachings. The suggestion to modify (and how to modify in this case) must be clear. In re Sang Su Lee, 277 F.3d 1338,1343; 61 USPQ2d 1430, 1433-1434 (Fed. Cir. 2002); Winner Int'l Royalty Corp. v. Ching-Rong Wang, 202 F.3d 1340, 1348-1349; 53 USPQ2d 1580, 1586-1587 (Fed. Cir. 2000). In this case, not only is the art insufficient to motivate or suggest the missing process steps of quenching and stabilizing, but the primary reference is contrary to the claimed invention. Reconsideration and allowance of the claims is respectfully requested.

Respectfully submitted,

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